Abstract

According to the present invention there is provided a coal-based carbon foam having a density of between about 0.1g/ cm^3 and about 0.8 g/cm^3, preferably between about 0.2 g/cm^3 and about 0.6 g/cm^3 and most preferably between about 0.3 g/ cm^3 and about 0.4 g/cm^3 that is produced by the controlled heating of high volatile bituminous coal particulate in a "mold" and under a non-oxidizing atmosphere. The high volatile bituminous coal starting material preferably exhibits a free swell index of between about 3.5 and about 5.0 and most preferably between about 3.75 and about 4.5. A number of additional highly desirable characteristics of the high volatile bituminous coal starting material are also described. The carbon foam product thereby produced can be machined, adhered and otherwise fabricated to produce a wide variety of low cost, low density products, or used in its preformed shape as a filter, heat or electrical insulator etc. Such carbon foams, without further treatment exhibit compressive strengths of up to about 6000 psi. Further treatment by carbonization or graphitization yields products that can be used as electrical or heat conductors. Methods for the production of these coal-based cellular products are also described.